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PATENT SPECIFICATION

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COMPLETE SPECIFICATION.

Improvements in Electro Magnetic Relays.

I, Archibald Montgomery Low, Captain in His Majesty's Army, of Royal Flying Corps Experimental Works, Feltham, Middlesex, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to electromagnetic relays and more particularly to relays actuated by small currents, and has for its object to provide a relay of this nature which while being responsive to comparatively prolonged impulses will be unaffected by momentary currents such, for example, as those due to atmospheric disturbances or to Morse code signals.

The invention consists in an electro magnetic relay by means of which the circuit passing the current to be relayed is closed only if the current passes for a period of time greater than a predetermined minimum.

The invention also consists in an electro magnetic relay comprising an armature and an electromagnet so arranged that the armature is moved periodically so that it approaches to contact with the keeper being held in contact only if either the armature or the keeper is energised.

The invention also consists in an electro-magnetic relay in which the armature is maintained in a state of continuous vibration which is only interrupted when the relay is subject to a current passing for a time greater than the period of vibration of the armature.

The invention also consists in the forms of electro magnetic relay hereinafter described and illustrated.

The invention may be applied with advantage to a relay of the kind described in my prior Specification No. 8981 of 1917 in which an iron armature is employed and the current which actuates the relay is used to excite the relay magnets, or it may be applied to relays in which permanent magnets are used, the actuating current being passed through coils capable of moving between the poles of the magnet.

The accompanying drawings illustrate several forms of relay in accordance with the invention.

Figure 1 is a plan of one form of relay constructed according to the invention.

Figures 2, 3, and 4 illustrate on a somewhat larger scale three forms of coil which may be employed in the instrument shewn in Figure 1.

Figure 5 is a plan of a modified form of relay and

Figure 6 is a similar view of a still further modification.

In carrying my invention into effect in the manner illustrated in Figures 1 to 4, I provide the relay with electro magnetic coils 1, 2, 3, 4, which are supplied with current from any convenient source, and the armature 5, the spindle of which may be mounted in a cage similar to that described in the before mentioned specification, comprises a pair of arms, 6, to which are attached the solenoidal coils, 7, the said coils being disposed between the electro magnets as shewn. Mounted on the armature spindle is the arm, 8, having at one end the contact making point, 9, while the other end of the arm has attached to it the spring strip, 10, adapted to be attracted by the electro magnet, 11, and to break the circuit of the said electro magnet at the points, 12, in the well-known manner, the arm, 8, and consequently the entire armature being thus maintained in a state of continuous vibration.

To assist in closing the points, 12, after they have been separated by the electro magnet, 11, a hair spring may be mounted on the armature spindle as described in Specification No. 8981 of 1917. Instead of employing an independent electro magnet, 11, I may arrange for the vibration of the arm, 8, to be effected by one of the relay magnets.

In Figures 2, 3 and 4 are shewn three convenient forms of solenoid which I may employ in the instrument shewn in Figure 1, the solenoid in Figure 2 consisting of a tube, 13, wound with wire, 14, and having a core consisting of wires, 15, of soft iron or the like passed through it.

In the form shewn in Figure 3 a tube, 13, wound with wire, 14, is employed, the tube being closed by the plugs, 16, of magnetic material, the ends of which are formed elliptical as shewn at the right hand side of the figure in order to concentrate the induced magnetism at points towards the extremities of the major axis of the ellipse.

The form shewn in Figure 4 is similar to that shewn in Figure 3, but the tube, 13, in this case is filled with iron filings 17.

In the modification shown in Figure 5 a ring-shaped electromagnet 18 is employed, similar to the magnet used in the d'Arsonval galvanometer, and the armature consists of a rectangular coil, 19, adapted to rotate between the poles of the magnet, 18. The arm, 20, is mounted above the magnet, 18, and is adapted to close the main circuit at the points 21. The armature is maintained in a state of vibration by means of the electromagnet 22 as previously described.

The modification shewn in Figure 6 is of the kind in which the current which actuates the relay passes through the relay magnets. Two such magnets 23 are shown in the figure, the armature 24 being pivoted at 25 between them; the resistance of the armature to attraction by the magnets is controlled by means of the adjustable spring 26. The armature has at one end an extension 27 to which is attached the contact point, 28, adapted, when the armature is attracted by the magnets, to make contact with the point, 29, to close the main circuit. The other end of the armature, 24, has an extension, 30, passing between the prongs of a fork, 31, which is attached to the armature 32, of the electromagnet, 33, the said armature, 32, being pivoted at 34 and being maintained in a state of vibration as already described. The armature 24 is consequently vibrated by the fork 31 which is provided with adjusting screws, 35, to vary both the amplitude of vibration and also the mean position of the armature.

A relay constructed as above described is very effective in damping out the effects of momentary currents, particularly if the period of vibration of the armature be made comparatively long.

It is to be understood that the invention is not to be confined to the foregoing details as the method of maintaining vibration of the armature and the manner in which the various parts of the relay are arranged in relation to one another may be suitably modified to suit any given requirements.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. An electromagnet relay by means of which the circuit passing the current to be relayed is closed only if the current passes for a period of time greater than a predetermined minimum.

2. An electromagnet relay comprising an armature and an electromagnet, in which the armature is moved periodically so that it approaches to contact with the keeper and is held in contact only if either the armature or the keeper is energised.

3. An electromagnetic relay in which the armature is maintained in a state of continuous vibration which is only interrupted when the relay is subject to a current passing for a time greater than the period of vibration.

4. An electromagnet relay as claimed in Claim 3, in which the armature is composed of solenoidal coils mounted upon a pivoted arm and adapted to be moved by continuously excited magnets, substantially as described.

5. A solenoid for use in a relay as claimed in Claim 4, consisting of a tube wound with wire and having iron wires passing through it, substantially as described.

6. A solenoid for use in a relay as claimed in Claim 4, consisting of a tube wound with wire and having its extremities closed by plugs of magnetic material, the outer ends of which are elliptical, substantially as described.

7. A solenoid for use in a relay as claimed in Claim 4, and of the kind claimed in Claim 6, in which the tube is filled with iron filings, substantially as described.

8. An electromagnetic relay as claimed in Claim 3 in which the armature consists of a coil of wire rotatably mounted between the poles of a ring-shaped magnet, substantially as described.

9. An electromagnetic relay as claimed

in Claim 3 in which the armature consists of an arm having two extensions one of which carries a contact point adapted to close the main circuit while the other passes between the prongs of a fork which is secured to the vibrating armature of an electromagnet, substantially as described.

10. Electromagnetic relays constructed, arranged and operating substantially in the manner hereinbefore described and as illustrated by the accompanying drawings.

Dated this 27th day of November, 1917.

MARKS & CLERK.

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[This Drawing is a reproduction of the Original on a reduced scale]

SHEET 1

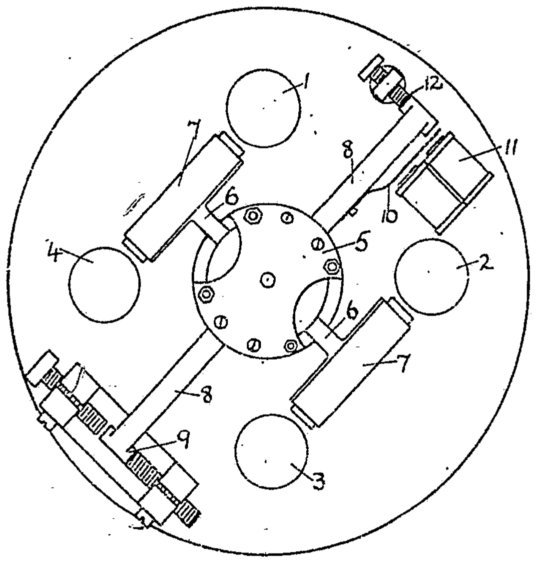

FIG. 1

SHEET 2

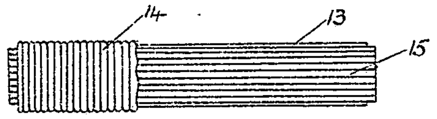

FIG. 2

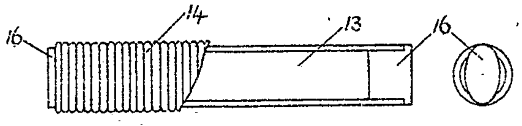

FIG. 3

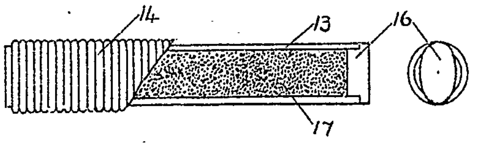

FIG. 4

3 SHEETS

SHEET 1

SHEET 3

SHEET 2

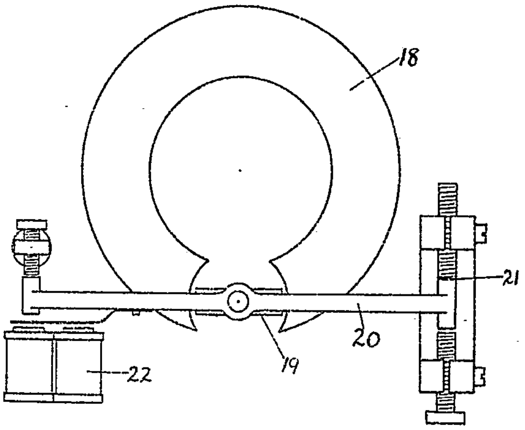

FIG. 5

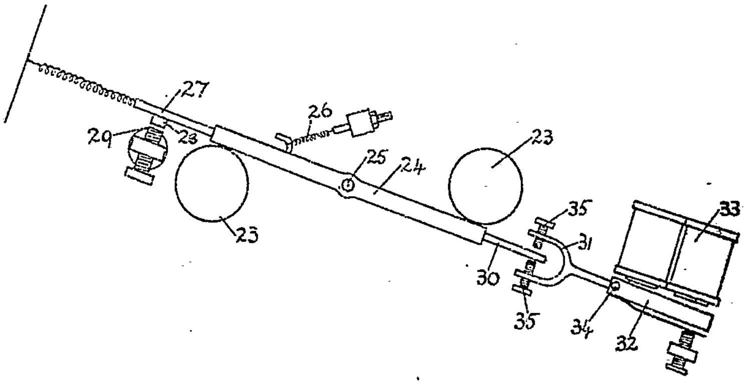

FIG. 6

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3 SHEETS

SHEET 1

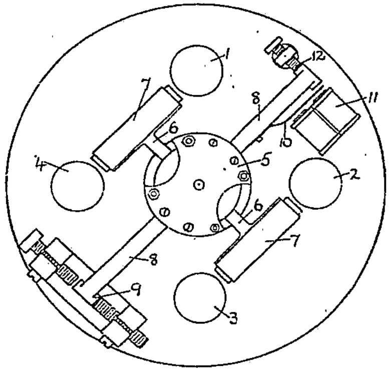

FIG. 1

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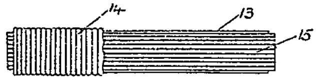

FIG. 2

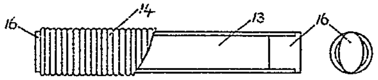

FIG. 3

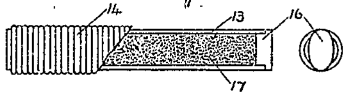

FIG. 4

SHEET 3

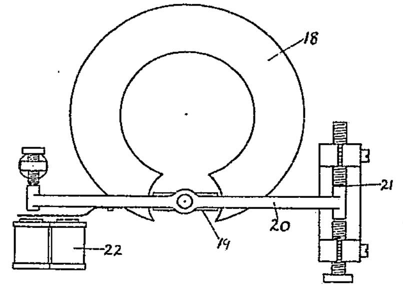

FIG. 5

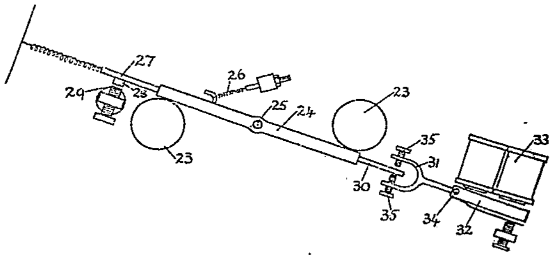

FIG. 6

[This Drawing is a reproduction of the Original on a reduced scale]

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